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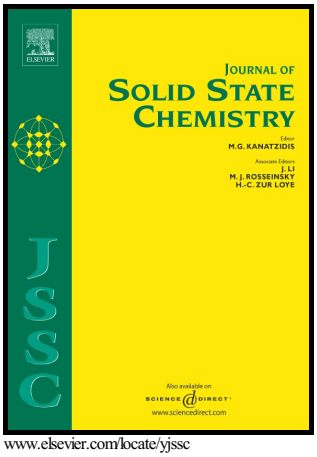


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# Influence of carbonate and nickel(II) concentration on the synthesis of calcium phosphates

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## Abstract

Two sets of Ni-substituted calcium phosphate were synthesized by precipitation method at pH = 7 and at two different concentrations of ion carbonate ($CO_3^{2-}$) in solution and Ni(II) concentrations lower than 15%. The produced solids were characterized by chemical analysis, infrared spectroscopy, x-ray powder diffraction and scanning electron microscopy. The solid samples obtained at low concentration of $CO_3^{2-}$ (5%) and Ni(II) concentrations 5, 10 and 15% were synthesized at 25 and 37 °C. All solids showed the presence of a stable and crystalline brushite ($CaHPO_4 \cdot 2H_2O$). The samples synthesized in presence of high levels of carbonate (50%) and Ni(II) concentration 5% at 25, 37 and 100 °C vary with temperature. Those obtained at the lower temperatures (25 and 37 °C) showed coexistence of two phases: a crystalline $CaCO_3$ and carbonate apatite with low crystallinity. At 100 °C, only carbonate apatite could be recognized. Data supported the carbonate substitution by $OH^-$ (position A) and $PO_4^{3-}$ (position B) in the hydroxyapatite structure. The comparison of the chemical analysis results of both systems studied (Ni,Ca) apatite and (Ni,Ca) carbonate apatite evidences a rise of Ni(II) incorporation in the apatite lattice, with simultaneous inclusion of $CO_3^{2-}$ and temperature increase. The obtained results suggest that brushite kidney stones development may be induced